

1 ALD DEPOSITION OF RUTHENIUM

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3 ABSTRACT OF THE INVENTION

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5 A method to deposit nucleation problem free
6 ruthenium by ALD. The nucleation problem free,
7 relatively smooth ruthenium ALD film is deposited by
8 the use of plasma-enhanced ALD of ruthenium underlay
9 for consequent thermal ruthenium ALD layer. In
10 addition, oxygen or nitrogen plasma treatments of SiO₂
11 or other dielectrics leads to uniform ALD ruthenium
12 deposition. The method has application as a direct
13 plating layer for a copper interconnect or metal gate
14 structure for advanced CMOS devices.